ception of sugar and amino-acids; it suffices at this stage if the student can differentiate the two classes of compounds, for the subject-matter is rather the origin and metabolism of carbon and nitrogen in Nature, and the supply of energy in the form of food. Food undergoes changes in the body as the result of enzyme action; the section on the nature of enzyme action is scarcely long enough, and reference must here be made to the "Principles." Respiration and oxidation are, in contrast, fully discussed. These two chapters are the chief ones in the book.

"Work—The Muscles and Stimulation—The Senses" are the subject-matter of chaps. iii. and iv. In the latter chapter there is a diagrammatic representation of the mechanism of the organ of Corti. Prof. Bayliss lays special stress upon a student getting a clear idea, even if it be erroneous, for it can be easily changed later, and it is far better than conflicting views which leave no impression. Chap. v. is a difficult one on "Adjustment—The Nervous System," and requires close attention to the text.

Chap. vi. is on "The Transport of Materials—The Vascular System." Here, again, we get an illuminating and fascinating description, while chap. vii., on "Growth and Reproduction," shows how the author himself has thought out his subject for explanation to the student.

Each chapter has a corresponding section on laboratory work, in which there is frequently some further explanation. The practical exercises illustrate the text, and are of varying difficulty. Many have been specially devised, while others are adaptations of existing experiments in physical chemistry or physiology. The value of experiments is very great, for science becomes a reality only in these circumstances. The average student may not appreciate the book, as it is not an "examination" manual. The time must soon come when the present system of practical examinations will be abandoned. Teachers should certify that their students have done a well-arranged course, and can do the experiments if given the proper opportunities.

Students of chemistry and physics will also find the book helpful in their work; many obscure points in their abstract information will be made clear by the descriptions here given. We agree with Prof. Bayliss that all beginners should have a course of *general* physiology, and we would fain see a return to the old system in which every science student worked through a course in physics, chemistry, and biology. The modern student has too restricted an outlook on one side or the other.

MENDELISM.

Mendelism. By Reginald Crundall Punnett. Fifth edition. Pp. xv+219+vii plates. (London: Macmillan and Co., Ltd., 1919.) Price 7*s.* 6*d.* net.

IN reviewing a new edition of a book so well known as Prof. Punnett's "Mendelism," it is unnecessary to notice more than the changes that have been made as compared with previous editions. The third edition (1911) was, in fact, a new book, and the fourth (1912) was substantially similar, with a certain amount of revision. Seven years have now passed, and although the war seriously interfered with genetic research in Europe, great progress in certain directions has been made in America, and it is to incorporate this new work that the chief changes in the present edition have been made. The first eight chapters are substantially unchanged, and comparatively little alteration has been made in the chapters on the economic aspect of genetics, on variation and evolution, and on man. To the chapter on intermediates there has been added an account of Nilsson-Ehle's theory of multiple factors as illustrated by his work on colour factors in wheat, by Davenport's work on mulattoes, and by Prof. Punnett's own work on the size-inheritance of fowls. Some special cases, such as that of doubleness in stocks, that were mentioned under various headings in previous editions are collected together into a special chapter on "Certain Complications." We note with regret that the hypothesis of "multiple allelomorphs," as illustrated by Nabours' experiments on grasshoppers and by certain characters in Drosophila—a hypothesis regarded by many as a preferable alternative to the presence-and-absence theory—is nowhere fully discussed.

The remaining changes and additions are almost entirely concerned directly or indirectly with the work of Prof. T. H. Morgan and his school on Drosophila—with the relations, that is to say, between Mendelian characters and sex, and with the theory that both Mendelian characters and sex are transmitted by chromosomes. Of the two chapters on sex, the first has been rearranged with some additions, but the revision has resulted (p. 92) in a reference to Abraxas as a case already described, while in fact it is not mentioned until p. 96. Incidentally, in this connection, it is an error to say that var. *lacticolor* has been recorded only in the south of Great Britain; the stock from which all or nearly all those now existing were derived came from Lancashire. We regret, also, that in this chapter the author has retained

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the notation *Ff* for female and *ff* for male, in birds and moths, when the symbols *Mm* for female and *MM* for male are so much simpler of application.

The second of the two chapters on sex, and that on the chromosome theory of heredity, are almost entirely new, and give a compact and useful summary of the outstanding facts derived from Drosophila and the hypotheses founded upon them. Since nearly all this work has been done in America, where students of genetics use the word "sex-limited" in a sense quite different from that in which it is employed in England, a few words on the use of the words "sex-limited" and "sex-linked" on the two sides of the Atlantic might have been a help to readers unfamiliar with the subject.

Although we have noted a few points in which we think the book might have been improved, we do so only because any blemishes, however small, are regrettable in a book of such general excellence. We still regard it, as we did in its earlier editions, as one of the best introductory treatises on the modern study of genetics.

L. DONCASTER.

AERONAUTICS IN ITALY.

(1) *Meteorologia Aeronautica.* By Prof. Giuseppe Crestani. Pp. xv + 315. (Milano: Ulrico Hoepli, 1919.) Price 8.50 lire.

(2) *Dizionario Internazionale di Aeronavigazione e Costruzioni Aeronautiche. Italiano, Francese, Inglese, Tedesco.* By Mario Mele Dander. Pp. vii + 227. (Milano: Ulrico Hoepli, 1919.) Price 6.50 lire.

(3) *L'Aviazione. Aeroplani, Idrovolanti, Eliche.* By E. Garuffa. Seconda edizione. Pp. xxiii + 955. (Milano: Ulrico Hoepli, 1919.) Price 20 lire.

(1) THE introduction and development of aerial navigation have brought into existence new applications of nearly every branch of experimental study, but perhaps none have been brought into greater prominence than meteorology. The safety and success of the pilot involve the most careful study and observation of every element, since barometric pressure, temperature, wind velocity, and cloud formation all affect the navigation of the machine. Hence Prof. Crestani's book will meet a real demand on the part of those who are training as pilots. There is, however, no essential difference between aeronautical and ordinary meteorology, except that more is required of the former. The first part deals with instruments and methods of observation. It describes the principal apparatus used in an observatory, and is in no way limited to the special equipments required for aircraft. Part ii. treats of the principal aerial phenomena, including atmospheric electricity. In part iii. the author deals with weather charts, pressure areas, and the circulation of the atmosphere, while part iv. is concerned with weather prediction. As an introduction to ordinary meteorology treated popularly, the book serves its purpose quite well. Still, as we have said above, something more is required by the pilot. We should like to see more about the means of making observations with the limited equipment that can be carried on aircraft, the modifications in weather prediction dependent on change of position and altitude during a flight, measurements and studies of solar radiation considered with reference to airships, and so forth. There is certainly room for additional treatment in regard to meteorological observations which are peculiar to aeronautical work. Meanwhile, the pilot must gain this knowledge by experience, and his one duty is to learn to observe and interpret phenomena instinctively.

(2) Lieut. Dander's pocket book provides for pilots and aeronautical engineers a dictionary similar in scope and plan to that supplied for gunnery by the "Trilingual Artillery Dictionary" reviewed in NATURE of November 27 last. It possesses, however, several features which were not contained in the subject of the previous review. Thus German is included, as well as English, French, and Italian, and, what is also extremely useful, anyone who is in doubt as to where to find a particular word will see at the end an index in which words in all four languages mixed are arranged in a single, strictly alphabetical sequence. This index is in rather small print, but as it is scarcely likely to be required up in the air this does not much matter. It renders the dictionary equally useful for persons of any of the nationalities which it covers, but English readers would prefer that the *genders* should have been indicated in Italian and French as well as in German. Airships as well as 'planes are considered, and materials of construction, including the names of timber trees, are fully dealt with, though the mathematical as distinct from the technical side is practically unrepresented. There are a few examples of weird English in the work, such as "three-plane," "helicoptery," "cok pit," "vestment" (for costume), not to omit the American "airplane." On pp. 48-49 the author evidently overlooks the possibility of wanting to paint anything red or black or even brown, but these colours are in other dictionaries.

(3) If Dr. Garuffa's book is to be regarded as representative of the present state of development of aeronautical engineering in Italy, English

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